Policy Paper: Excise Tax on Cigarettes in the 2023/24 Budget

1. SUMMARY

This note contains policy proposals on tobacco taxation from NDRI for the fiscal budget for FY 2023/24.

Nepal is currently facing a challenging economic environment. Domestic revenues are below target, leading to a 14% reduction in the budget ceiling for 2022/23. Exports are down, leading to an increase in the trade deficit which is forecast to hit NPR 2 trillion by the end of the financial year. Domestic and external debt levels are rising. The government needs to take bold steps in response to increase revenues and support the Nepalese economy.

Experience from last two years proves that raising tobacco tax is an effective way to raise revenues. Tax rises in the 2021/22 and 2022/23 budgets have led to a NPR 11.1 billion boost to revenue collections. Alongside this, there has been no evidence of negative impacts to consumers or industry. The combined pre-inflation price rise for both the tax rises on the most sold brand-was just 1.2 rupees per cigarette, while the industry continues to generate significant profits. With Surya Nepal Private Limited (SNPL), the largest tobacco company in Nepal maintaining an A1+ credit rating from CARE Ratings Nepal Limited during each year of the tax increase. There has been no impact to the levels of illicit trade with an NDRI study estimating that less than 1 percent of packets in 2021 had illegally entered the country.

However, tobacco taxation on cigarettes is still an underutilised resource. Despite taking positive steps in the past two years, Nepal still has the lowest level of tobacco tax in the region. Tax as a percentage of the retail price in Nepal is only 41 percent, compared to India, the next lowest in the region, whose rate of tax is 53 percent. If Nepal was to have a level of tax that matched India, the country could see a NPR 23.6 billion increase in domestic revenues. The cost to the economy of the country's wide-scale tobacco use is significant and currently outweighs any benefits to the treasury from revenue collections. NDRI analysis estimates that revenues collections from tobacco taxation only covers 65 percent of the costs to the economy tobacco use generates.

There is widespread support for increasing the rates of tobacco taxation. Nationally, 3 in every 4 people (76 percent) support a rise in tobacco taxes, including over half of smokers (55 percent). Within parliament, there is cross party support for stronger government action. Senior figures across all the major parties, including the current Rt.Hon. PM, Pushpa Kamal Dahal have pledged their support for further increases to tobacco tax levels.

NDRI recommends that tobacco excise rates be increased by at least 40 percent this year. A 40 percent increase could generate an additional NPR 10.7 billion in revenue. This is equivalent to over 2 percent of the estimated budget deficit. This could directly help with the government's plans for the next budget year i.e. to make municipal hospitals at each local level or other major development priorities. Adopting a more ambitious target of a 65 percent rise could lead to an extra NPR 16.8 billion, covering over 3 percent of the budget deficit.

NDRI also recommends replacing the current, complex 5-tier system with a more straightforward 3-tier system. Consumption in the first two tiers is very low, and as such, these could be collapsed upwards with minimal impact on consumers. If enacted, alongside a 40 percent rise in tobacco excise rates, revenue could rise by a further NPR 165.1 million. Reducing the number of tiers would prevent tobacco companies from repositioning cigarette products in the lower tiers and reduce government administration costs. This could also set in motion a process to gradually move to a uniform system, eventually reducing the remaining three tiers to just one single rate of tax.

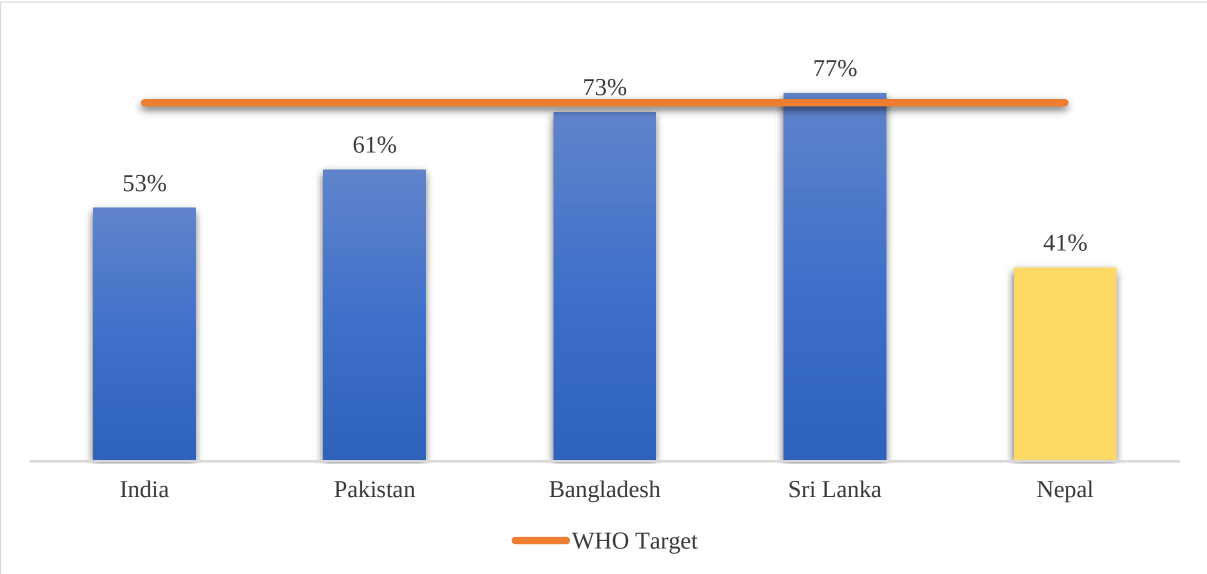
2. CONTEXT

Tobacco use is a major public health problem in Nepal that has both economic and public health consequences. Nepal has one of the highest smoking prevalence's in the South Asia region and highest number of deaths from smoking. The most recent figures show that tobacco was responsible for nearly one in five deaths in Nepal (19 percent)[1]. In comparison, the number in India, who have a higher rate of taxation on tobacco, was half that rate at 9.5 percent[2].

The problem is likely to only get worse without firm government action. Despite positive steps in recent years, tobacco costs are still low and affordable to most of the public, contributing to a consistently high prevalence rate of 32 percent. A NDRI conducted survey found that just under half of respondents (47 percent) believe the government has the largest responsibility to control tobacco use.[3]

Tax rates on tobacco in Nepal are still very low compared to neighbouring countries and international recommendations. Even with the increases in tobacco tax rates in FY2021/2022 and FY2022/2023, tax as a percentage of the retail price in Nepal is still one of the lowest in region at the only 41 percent, compared to much higher rates of taxation in neighbouring countries. In India, tax is 53 percent of the retail price, and in Sri Lanka, it is 77 percent. The WHO recommendation is a minimum of 75 percent.

Figure 1: Regional comparison of tobacco tax as a percentage of cigarette retail price



Source: Data for Pakistan, Bangladesh and Sri Lanka taken from the most recent WHO data (2020) on taxes as a percentage of price on the most sold brand of cigarettes, data for India and Nepal calculated from NDRI estimates using data from 2023

Nepal like many countries currently is facing an uncertain fiscal situation. Revenues are below target, the trade deficit is rising and inflation has recently been in double digits. The government has already had to cut the budget for FY2022/23 by 14 percent due to falling revenues.

The high tobacco use in the country is adding further pressure to the economy. NDRI estimated that in the financial year 2021/22 the direct and indirect economic costs linked to tobacco use in Nepal was

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[1] NDRI (2022). *Health Impact of Tobacco in Nepal: A country report based on the 2019 global burden of diseases study*.

2 World Health Organisation (2018). *Factsheet 2018 India*.

[3] NDRI (2020). *National Survey on Socio-Economic and Policy. Aspects of Tobacco Use in Nepal.*

NPR 39.8 billion[4]. This was equal to around 1 percent of total GDP. In the same year, revenues from tobacco taxation totalled NPR 25.9 billion, meaning that they only covered 65 percentage of the cost to the economy tobacco use made.

Increasing the tax rate on tobacco is a win-win policy: it generates additional revenue for the Ministry of Finance and supports public health. With increased pressures, it is critical to find a way to raise much-needed revenue without excessively burdening the economy. Taxation on unproductive goods such as tobacco provides this opportunity. Moreover, increasing tobacco taxation is good for public health since an increase in tobacco prices leads to a decline in tobacco consumption. In fact, increasing tobacco taxation is widely considered the most effective method to reduce consumption.

Other countries in the region are taking advantage of this approach, with significant rises to their rate of tobacco tax. In 2023, Pakistan raised their rate of Federal Excise Duty by 154 percent. Increases were also seen regionally in India and Sri Lanka. These countries estimate significant rises to their revenue collections because of the changes. If Nepal increased their rate of taxation to equal the current rate in India, the country could see between NPR 17.2- 23.6 billion increase in domestic revenues.

There is significant support for increasing tobacco taxation. A national survey by NDRI found that 3 in every 4 people (76 percent) in Nepal supported a rise in tobacco taxes, including over half of smokers (55 percent). There was sizeable demand for dramatic increases to the overall rate with over a third of respondents (38 percent) calling for tax rates to be over 60 percent of the retail price.[5] Over 90 percent of respondents in the Kathmandu Valley wanted the government to take a firm approach tobacco epidemic, saying they would support the implementation of stricter rules and regulations against tobacco products in Nepal.[6] There is also cross-party support across parliament. 36 candidates, including 20 that were successfully elected as MPs, pledged to help curb tobacco use across Nepal, including backing an increase to the rate of taxation. This includes the current Rt. Hon. PM, Pushpa Kamal Dahal, and the General Secretary of Nepali Congress, Gagan Thapa, as well as other senior leaders across all the major parties including Nepali Congress, Maoist Centre and Communist Party of Nepal (Unified Marxist–Leninist).

3. IMPACT OF 2021/22 and 2022/23 EXCISE TAX INCREASE

In the past two years, Nepal has seen consecutive growth in the rate of excise tax. This has led to significant increases to revenues collected, while also having a limited impact to industry and consumers. This shows that there is still space for the government to go further.

In the FY2021/2022, the government enacted a 25 percent rise in excise duty and 20 percent rise in the Health Hazard Tax across all cigarettes. In the same year, revenues generated from tobacco rose to NPR 25.9 billion, an increase of NPR 5.5 billion compared to the previous year. This was an increase of 27 percent. Despite the significant rise in revenues, the impact to consumers was limited. NDRI estimates that the tax rise led to a 0.7rupee increase in price per cigarette in the most consumed taxation category (assuming 100 percent of the tax increase is passed on to the consumer). Evaluation of the 2021 annual report released by Surya Nepal Private Limited (SNPL), the largest cigarette company in Nepal, show that sales of cigarettes increased year-on-year by 7 percent leading to an increase in gross revenues also by 7 percent. This, combined with internal analysis by NDRI, suggests there was no impact on total consumption because of the tax increase.

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[4] Direct costs are those related to the health care expenditure on smoking attributable diseases while the indirect cost covers the productivity loss from morbidity and mortality linked to smoking. The estimated cost is only for smoking and excludes cost of smokeless tobacco.

[5] 13 percent of respondents stated that taxation should be 61-80 percent of the retail price and 25 percent wanting it to be over 80 percent.

[6] Results from rapid survey conducted by Annapurna Media Network in November 2022 across different areas of Kathmandu valley. 95 percent of respondents wanted to see the new government take the tobacco epidemic seriously and 91 percent of respondents wanted to support the government in implementing strict rules and regulations against tobacco products in Nepal.

The impact of the tax rises in FY2022/2023 also shows significant revenue benefits with limited impact to consumers. The government increased the excise duty on average by 17 percent across the 5 different cigarette tiers.

Table 1: Increases in Excise Duty by tier (FY2022/2023)

Cigarette type		Increase in Excise Duty, percent
Tier 1	Without Filter	14.89
Tier 2	Up to 70 mm length (with filter)	13.30
Tier 3	More than 70 mm up to 75mm in length (with filter)	20.73
Tier 4 *	More than 75mm up to 85mm in length (with filter)	20.00
Tier 5	More than 85mm in length (with filter)	16.86

*Most consumed taxation tier

Ministry of Finance forecasts released estimate that this rise in tobacco tax will generate a total of NPR 31.6 billion in revenue, a 22 percent rise on the previous year. Again, there is no evidence to suggest that this increase has had a negative impact on industry or consumers. NDRI estimates are that the 20 percent increase in tax to the most consumed taxation category has increased the price per cigarette in that category by 0.5 rupees. Given the Ministry of Finance revenue estimates, there seems to have been limited impact in overall cigarette consumption.

4. RECOMMENDATIONS FOR THE 2023/24 BUDGET

1. **NDRI recommends that the Ministry of Finance build on the positive progress achieved last year and continue to pursue further increases in tobacco taxation.**

NDRI recommends an increase in excise duty of at least 40 percent. This would generate an additional NPR 8.7 – 10.7 billion in revenue – equivalent to around 2 percent of the original budget deficit for FY 2022/23.[7] Given the current fiscal situation in Nepal, this additional revenue could make a vital contribution towards supporting all areas of public spending. Moreover, an increase of 40 percent in excise duty would have minimal impact on the price of cigarettes. Consumers would only see an increase of NPR 1.3 rupees per cigarettes in the most popular taxation tier, an increase of 11 percent (11.1).

An increase of 40 percent would start to close the gap between Nepal and its neighbours. However, Nepal's rate of tobacco taxation would still be significantly lower than others in the region. A rise of 40 percent would increase Nepal's level of tobacco tax to 46 percent of the retail price.[8] If the government increased tobacco excise rates by 40 percent every year, it would take two years before tax would be at the same rate as in India, given their rates remain constant, and six years before Nepal reached the WHO target of 75 percent taxation.

Table 2: Change to excise tax rate under 40 percent rate increase by tier

Cigarette type		2022/23 excise tax rate (per 1000 sticks)	Excise tax rate after 40 percent increase (per 1000 sticks)
Tier 1	Without Filter	710	994

[7] The budget deficit for FY2022/23 is NPR 498.3 billion as taken from the budget report for the fiscal year 2022/23.
[8] This assumes the only change in price is from the rise in taxes, which would be passed on 100 percent to consumers.

Tier 2	Up to 70 mm length (with filter)	1635	2289
Tier 3	More than 70 mm up to 75mm length (with filter)	2225	3115
Tier 4*	More than 75mm up to 85mm length (with filter)	2880	4032
Tier 5	More than 85mm length (with filter)	3965	5551

*Most consumed taxation tier

However, if the government wishes to pursue a more ambitious increase, NDRI recommends an increase of 65 percent. This would generate more revenue: up to an additional NPR 16.8 billion per year. This equates to over 3 percent (3.4) of the forecast budget deficit for FY 2022/23. Considering the current financial pressures, this is an attractive option.

The impact on prices under this option would be more pronounced but still not significant. A 65 percent increase in tobacco excise would, on average, lead to an increase of 18 percent in the price of a 20-pack of cigarettes in the most popular taxation tier (or NPR 2.1 per cigarette). This would likely be more unpopular with the industry and consumers. However, as well as sustainably boosting revenues, a 65 percent increase could have real public health benefits driving down tobacco consumption rates and easing the pressure on the health care system over time.

Under this option, Nepal would still have the lowest tax rates in the region, estimated to rise to 49 percent. If the government increased tobacco excise duty by 65 percent every year, it would take two years before tax would be the same rate as India, assuming they do not increase their tax rates, and four years to reach the WHO threshold.

Table 3: Change to excise tax rate under 65 percent rate increase by tier

Cigarette type		2022/23 excise tax rate (per 1000 sticks)	Excise tax rate after 65 percent increase (per 1000 sticks)
Tier 1	Without Filter	710	1172
Tier 2	Up to 70 mm length (with filter)	1635	2698
Tier 3	More than 70 mm up to 75mm length (with filter)	2225	3671
Tier 4*	More than 75mm up to 85mm length (with filter)	2880	4752
Tier 5	More than 85mm length (with filter)	3965	6542

*Most consumed taxation tier

2. **NDRI recommends that the Ministry of Finance reform the taxation system to gradually move towards a uniform system, starting by collapsing Tier 1 and Tier 2 in this budget.**

A single excise tax rate for cigarettes would enable tax increases to be more effective in reducing consumption, and it would save Government costs by being simpler to administer. A uniform system is universally recognised as the “gold standard”. The current tax system is complex, with five different tax tiers for each different length of cigarette. This reduces the potential impact of tax increases on consumption. This is because:

(i) multiple tiers create opportunities for cigarette companies to reposition their products to lower tax bands to offset some tax increases

(ii) the wide range in tax rates translates into a wide range of cigarette prices in the market allowing for consumers to substitute more expensive cigarettes for cheaper ones.

As a first step, NDRI recommends that the current 5-tier system should be replaced by a simpler 3-tier system. The most straightforward way to move to a uniform tax system is to gradually collapse each tier upwards. NDRI's peer-reviewed study on illicit trade collected empty (sold) cigarette packets from retailers across Nepal.[9] This data has enabled us to develop a picture of market share – that is, which tax tiers are most popular with consumers. These market shares are presented in the table below:

Table 4: Market share by tier

Cigarette type		Market share
Tier 1	Without Filter	0.7 percent
Tier 2	Up to 70 mm length (with filter)	0.0 percent
Tier 3	More than 70 mm up to 75mm in length (with filter)	41.4 percent
Tier 4	More than 75mm up to 85mm in length (with filter)	57.6 percent
Tier 5	More than 85mm in length (with filter)	0.3 percent

These findings suggest that consumption in the first two tiers is very low. These tiers could be collapsed upwards with a very limited impact on consumers whilst providing additional revenue. For instance, if government increased excise tax by 40 percent and collapsed the first two tiers upwards, this could raise an additional NPR 165.1 million. This would rise to NPR 189.0 million if the more ambitious rate of 65 percent was chosen.

This would leave a simpler 3-tier system remaining:

1. Up to 75mm or unfiltered
2. In more than 75mm up to 85mm length (with filter)
3. In more than 85mm length (with filter)

This would prevent tobacco companies from repositioning cigarette products in the lower tiers in the future, whilst the immediate impact on consumers would be limited. Over the next 2-3 years, the government could gradually close the gap between tiers by applying higher increases to the lower tiers, until finally reducing the system to just one tax tier.

5. CONCERNS AND COUNTER-ARGUMENTS

There have been a few misconceptions on the potential impact of further increases to tobacco taxation. However, they are not supported by the evidence. We will address them here:

Illicit trade: One argument against further raising taxes has been that increases in tobacco taxes could lead to an increase in illicit trade. This argument is not supported by the evidence. NDRI's study finds a very low level of illicit cigarettes in the market – less than 1 percent (0.33) of sampled packets. This study took place at the end of 2021, 6 months after the government implemented a 25 percent increase in tobacco excise tax, and the illegal packets that were identified were mostly more expensive than the average price of cigarettes in Nepal. The findings suggest the risk of increases in excise or price leading to an uptick in illicit trade is extremely low.

Industry impact: Another concern sometimes expressed is that raising taxes could negatively impact Nepalis employed in the tobacco industry domestically. However, SNPL's annual reports show that its post-

[9] NDRI (2022) *Report on Extent of Illicit Cigarette Trade in Nepal.*

tax profits from cigarette sales saw double digit growth year-on-year between 2011 and 2018, averaging 22 percent growth every year. Gross revenues in 2021, the most recent year available publicly, rose 7 percent. There has been no significant impact to jobs from either of the tax rises so far. Given the relatively inelastic demand for cigarettes, there is substantial room for tobacco companies to remain profitable whilst government raises further revenue from the sale of tobacco products.

Substitution to new forms of tobacco: Some concerns have been raised to suggest that increasing the rate of tax on commercial cigarettes will push people to consume other forms of tobacco particularly those domestically consumed such as bindis or handrolled cigarettes. However, this is not an argument against tobacco tax rises for cigarettes, rather it supports the expansion of tobacco taxes to cover all tobacco products to avoid any substitution effect between products. It also highlights the importance of having a uniform rate of taxation across cigarette tiers to avoid tobacco companies manipulating the structure to make the cost of the cheapest types remain low. The costs of cigarettes in Nepal are still low in comparison to other countries in the region. In the most recent WHO data, Nepal had the lowest cost cigarettes across all South Asia.[10] [11] This means there is still significant scope to increase the price of cigarettes without significantly effecting people's consumption habits.

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[10] From WHO data for 2020, refers to cost of the cheapest cigarette brand using purchasing power parity USD.
[11] South Asia refers to Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

APPENDIX: METHODOLOGY

This section outlines the analytical methodology used to estimate the changes in consumption of cigarettes and tax revenue in response to different tax increases. This analysis was used to inform our policy recommendations.

Firstly, we estimated the level of consumption of cigarettes in different taxation tiers and how much revenue is raised within each tier. For this, we used data collected on the market share of each tax category and the total tax revenue from cigarettes.

Then we estimate the effect of increased taxes on the price of cigarettes, and by applying a price elasticity of demand, we can estimate the change in consumption of cigarettes in response to a price.

Finally, we use the new estimates of consumption to calculate the changes in tax revenue. In the absence of data on the revenue collected in the fiscal year 2022/23, we used the estimates released by Ministry of Finance in the Budget speech. We then used that figure with our estimation for consumption in 2022/23 as the basis for our projections for 2023/24.

1. DATA SOURCES

In order to calculate price, consumption, and revenue estimations, we required information on the past tax revenue, current price and consumption data, and the price elasticity of demand and supply for cigarettes. The table below provides detail on the data sources that were used in our analysis.

Information	Source	Notes on data
Current and historic tax levels	Aarthik Bidhayak (various years)	Excise duty (per 1000 sticks) for 2020/21, 2021/22 and 2022/23
Revenue collected from cigarette excise duty	Inland Revenue Department. Annual Report 2077/78. Kathmandu, 2021. Inland Revenue Department. Annual Report 2078/79. Kathmandu, 2022.	Revenue collected from cigarette excise duties in 2020/21 and 2021/22 financial years
Revenue estimates from cigarette excise duty	Budget Speech for the fiscal year 2022/23	Estimates of revenue collected from cigarette excise duties in 2022/23 financial year
Price	Nepal Development Research Institute. “The Extent of Illicit Trade in Nepal.” 2022	In 2021, NDRI collected cigarette packets from retailers across Nepal to look for characteristics of illegality. From these packets, NDRI recorded the Maximum Retail Prices for different brands. Using this data, NDRI has calculated a weighted average price for cigarettes in taxation tier 4 (the most popular category). In 2023, NDRI conducted further price analysis by collecting the maximum retail price for the most popular category (tier 4) and calculated a weighted average price across the tier.
Market share of different taxation tiers	Nepal Development Research Institute. “The Extent of Illicit Trade in Nepal.” 2022.	In the illicit trade study mentioned above, NDRI collected data on the consumption of cigarettes in different tax tiers as measured by

		the collection of empty cigarette packets. One caveat is that the sample was not nationally representative. In particular, it was under-representative of Nepal's urban population. However, while this may have an impact on the specific brand popularity, we believe that the overall market shares are still accurate. The most popular tier (tier 4) is in line with WHO analysis.
Price elasticity of demand	U.S. National Cancer Institute and World Health Organization. The Economics of Tobacco and Tobacco Control. National Cancer Institute Tobacco Control Monograph 21. Bethesda, MD: NIH Publication No. 16-CA-8029A, 2016.	International evidence that the Price Elasticity of Demand for cigarettes in developing countries is between -0.4 and -0.8. We applied this range to our analysis to generate an upper and lower bound for revenue and consumption estimates.

2. CHALLENGES AND ASSUMPTIONS

Several data challenges required us to adapt our methodology:

1. **Absence of up-to-date revenue figures:** Calculating the changes in tax revenue due to changes in tax rates for cigarettes in 2022 requires information about the tax revenue for the fiscal year 2022/23. However, this information is not yet available as the fiscal year is not yet finished. We therefore used the estimates published by the Ministry of Finance (MOF) in the budget speech as our assumed revenues for 2022/23. This was NPR 31.6 billion.

2. **Selection of appropriate price data:** When calculating the excise duty as a percent of the retail price, the World Health Organization (WHO) uses the price of the most expensive brand for their reference price. One criticism of this approach is that it adds a downward bias in calculating the tax as a percent of the retail price, given that it uses the cost of the expensive brand rather than most popular. NDRI's illicit trade study found that Shikhar Ice Rush was the most popular brand in Nepal, marginally above the most expensive which was Surya Luxury Kings (which is more prevalent in urban areas). We have addressed this issue using the average weighted price of all the cigarette brands in most sold tax category (tier 4 – 75-85mm).

3. **The assumption on the changes in price:** Because we are only using the weighted price for taxation tier 4, we have assumed that the average response in price will be identical/similar across all taxation tiers. This means we can apply the same average expected percentage change in price following a tax increase across all tiers.

3. ANALYSIS

STEP 1: ESTIMATING BASELINE CONSUMPTION PER TAX TIER USING 2020/21 REVENUE DATA

The total tax revenue from cigarettes in 2020/21 was NPR 20.39b. We use the excise rates from "Aarthik Bidhayak" from MOF and the market share data from Nepal Development Research Institute's own study "*The Extent of Illicit Trade in Nepal*, 2022" to calculate the number of sticks consumed and the tax revenue collected from each category of cigarettes shown in **Error! Reference source not found.**.

Note, the market share data covers the year 2020/21. That is why the baseline consumption data is calculated for that year.

Table 5: Calculating consumption and revenue per category, 2020/21

Category (n)	Excise Rates (t_n)	Market Share (p_n)	# of Sticks (Q_n)	Tax Revenue (TR_n)
Unfiltered	0.495	0.0067	79060951.76	39135171.12
Up to 70 mm	1.135	0	0	0
70-75mm	1.474	0.4142	4887618838	7204350168
75-85mm	1.920	0.5763	6800421865	13056809981
85mm +	2.715	0.0028	33040397.75	89704679.89
Total		1	11800142053	20390000000

The calculation for this is as follows. Let Q_n be the number of cigarettes and p_n be the market share or the proportion of cigarettes, and t_n be the excise tax rate of cigarettes in category n as represented by the following categories:

0 = Unfiltered
1 = Up to 70 mm
2 = 70-75mm
3 = 75-85mm
4 = 85mm +
t = Total

Let Q_t be the total quantity of cigarettes such that,

$$p_n Q_t = Q_n. \tag{1}$$

$$\sum p_n Q_t t_n = TR_t, \tag{2}$$

where TR_t is the total tax revenue from all cigarettes and $(p_n Q_t t_n)$ is the tax revenue from category n. Replacing p_n, t_n, and TR_t gives us the total quantity of cigarettes $Q_t = 11800142053$. Replacing this value in (1) gives us the number of sticks in each category.

We can now get the tax revenue from each category by taking the product of the number of sticks and the excise rates:

$$TR_n = Q_n t_n. \tag{3}$$

STEP 2: ESTIMATING THE CHANGE IN CONSUMPTION FOLLOWING THE TAX RISES IN 2021/22 AND 2022/23

Before estimating the tax revenue for 2023/24, we need to estimate the consumption and tax revenue for 2021/22 and 2022/23. Luckily it is possible to know the impact to tax collections with the actual 2021/22 figure published by the MoF in the Budget Speech and the 2022/23 budget also published by the MoF including an estimate of the 2022/23 collections. For 2021/22, tobacco tax revenues were NPR 25,928,900,000, while the estimate for 2022/23 is NRP 31,570,000,000. These are the figures used in the model.

Assuming that the market shares of each tier is unchanged from the 2020/21 and given that we know the changes to the excise rate for each tier in 2021/22 and 2022/23 and the actual/estimated tax revenues for the same years, it is possible to derive the updated consumption and revenue per category, using a similar approach to the previous section.

Given (2), it is possible to rearrange the formula to calculate the total number of cigarettes sold as:

$$\sum Q_t = \frac{TR_t}{\sum p_n t_n}, \tag{4}$$

Once the total number of cigarettes is known, this can then be spilt into the five tier categories, matching the known market share data. Then using (3), the estimated revenue for each tier category can be calculated.

Table 6: Calculating consumption and revenue per category, 2021/22

Category (n)	Excise Rates (t_n)	Market Share (p_n)	# of Sticks (Q_n)	Tax Revenue (TR_n)
Unfiltered	0.618	0.0067	80422706.65	49701232.71
Up to 70 mm	1.418	0	0	0
70-75mm	1.843	0.4142	4971803746	9163034303
75-85mm	2.400	0.5763	6917553111	16602127467
85mm +	3.393	0.0028	33609489.35	114036997.4
Total		1	12003389053	25928900000

Table 7: Calculating consumption and revenue per category, 2022/23

Category (n)	Excise Rates (t_n)	Market Share (p_n)	# of Sticks (Q_n)	Tax Revenue (TR_n)
Unfiltered	0.710	0.0067	81440520.57	57824414.71
Up to 70 mm	1.607	0	0	0
70-75mm	2.225	0.4142	5034725914	11202536530
75-85mm	2.880	0.5763	7005100299	20174688862
85mm +	3.965	0.0028	34034844.42	134950193.4
Total		1	12155301578	31570000000

STEP 3: ESTIMATING THE CHANGE IN PRICE FOLLOWING A TAX RISE

To estimate an initial price in 2020, we use the average weighted price of the most sold category, tier 3, of NPR 10.80 (including VAT) per stick

This category's initial excise tax rate in 2020/21 was NPR 1.92 per stick, and the new excise duty per stick, introduced in 2021/22, was NPR 2.40. In the same period, the health hazard tax (HHT) increased from NPR 0.50 to NPR 0.60 per stick – an increase of NPR 0.10 per stick.

Let, $t_n^{20}, t_{n,}^{21}$ and t_n^{22} be the excise duty per stick for 2020/21, 2021/22, and 2022/23. Assuming that 100 percent of the tax increase is passed on to the consumer, the increase in price (excluding VAT) would be equal to the increase in tax, i.e.

$$= (t_n^{21} - t_n^{20} + \Delta HHT)$$
$$= (2.40 - 1.92 + 0.10)$$
$$= 0.58.$$

Hence, the price increases from NPR 9.56 to NPR 10.14 (excluding VAT). With a VAT of 13 percent, the final price comes out to NPR 10.46, a 6.1 percent increase in the retail price. This approach is taken across all tiers.

The same approach was taken to estimate the impact of the tax increases in 2022/23. Under the same assumptions, the increase in price (excluding VAT) would be given as:

$$= (t_n^{22} - t_n^{21} + \Delta HHT)$$
$$= (2.88 - 2.40 + 0.00)$$
$$= 0.48.$$

This means the price would increase from NPR 10.14 to NPR 10.62 (excluding VAT). With a VAT of 13 percent, the final price would come out to NPR 12.00, a 4.73 percent increase in the retail price.

However, both of these approaches assume 100% of the tax increase is passed on to the consumer. In order to check this assumption, NDRI conducted a price analysis of the most common cigarette brands within the 75-85mm tier. Using a simple average, the new baseline price was estimated as NPR 11.97, only 0.03 rupees less than the NDRI estimated price of NPR 12.00.

Table 8: Maximum Retail Price for the 75-85 mm cigarettes in 2022/23

Cigarette Brand	Price per pack (20 cigarettes), NPR	Price per cigarette, NRP
Captain Filter Kings	128	6.40
Captain Mountain Fresh	156	7.80
Shikhar Filter Kings	215	10.75
Shikhar Ice Rush	215	10.75
Shikhar Select	120	6.00
Surya 24 Carat	340	17.00
Surya Luxury Blue	340	17.00
Surya Luxury Kings	320	16.00
Surya Mint Switch	340	17.00
Winston	230	11.50
Winston Purple Mint	230	11.50
Average price	*239.45*	*11.97*

Given this figure, it was estimated that the increase in price passed onto the consumer was slightly less at NRP 0.46. This calculated by estimating the pre-VAT price[12] as NPR 10.59 and using that amount to estimate the price change from the previous year[13].

STEP 4: ESTIMATING THE CONSUMPTION AND TAX REVENUE FOR 2023/24 UNDER (I) A 40 PERCENT INCREASE AND (II) A 65 PERCENT INCREASE.

In order to estimate the impact of a potential tax rise to consumption and tax revenues, first we estimate the impact of the suggested tax rise to the price, following the method set out in the previous section. Once the new price has been estimated, we can use the price elasticity of demand (ϵ) of -0.8 and -0.4 to calculate the upper and lower estimates of the change in consumption.

For example, let, $t_n^{22}, t_{n,}^{23}$ and t_n^{24} be the excise duty per stick for 2022, 2023, and 2024, with the 2024 excise duty increasing by 40% as suggested by this report. This would mean that the increase in price for 2024 would be:

$$= (t_n^{24} - t_n^{23} + \Delta HHT)$$
$$= (4.03 - 2.88 + 0.00)$$
$$= 1.15.$$

Hence, the expected price increase is estimated as rising from NPR 10.64 to NPR 11.77 (excluding VAT). With a VAT of 13 percent, the final price comes out to NPR 13.30, a 11.08 percent increase in the retail price.

With a 11.1 percent increase in the price of cigarettes, we expect each categories' consumption to fall by 4.43 percent if PED is -0.4 and 8.87 percent if PED is -0.8.[14]

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[12] 11.97/1.13 = 10.59

[13] 10.59 - 10.14 = 0.45 (rounded)

[14] 11.08 x 0.4 = 4.43, and 11.08 x 0.8 = 8.87

Once we get the final quantities for each category,[15] we take the product of these quantities and the new excise tax rates for 2024 and then take their sum such that,

$$TR^{24} = \sum_{n=0}^{5} t_n^{24} Q_n^{24}, \tag{5}$$

where TR^{24} is the total potential tax revenue from excise taxes for 2024, and Q_n^{24} is the expected number of sticks consumed in 2024 for category n.

While this example has focused on the estimates from the recommended 40% rise in excise taxes, we used the model to estimate the impact of various tax increase in excise duties, all following the same approach.

Table 9 shows the results of the two approaches highlighted in this report.

A modest 40 percent increase in excise duty is estimated to reduce consumption on average to 11.34b (-6.67 percent decrease) and increases the median tax revenue to 41.25b (35.91 percent increase).

Under the progressive case, raising the excise duty by 60%, tax revenue is estimated to significantly rise whilst having a pronounced effect on reducing consumption. We estimated that the median tax revenue would increase by NPR 14.92 billion (47.27%), and the median consumption would fall to 10.85 billion (-10.74%).

Table 9: Estimating the effects of tax measures set out in recommendations

Year	Description	Value	Δ	$percent\Delta$
I. Conservative Case: Assuming a 40 percent increase in tax				
2023	Tax rate (C_3)	4.03	1.15	40.00%
	HHT	0.60	0.00	0.00%
	Price per stick (excluding VAT)	11.77	1.18	10.85%
	Price per stick (including VAT)	13.30	1.33	10.85%
	$\epsilon = -0.8$			
	Consumption (# of sticks)	11.07b	-1.08b	-8.89%
	Tax Revenue	40.27b	8.70b	27.56%
	$\epsilon = -0.4$			
	Consumption (# of sticks)	11.62b	-0.54b	-4.44%
	Tax Revenue	42.23b	10.66b	33.78%
II. Progressive Case: Assuming a 65 percent increase in tax				
2023	Tax rate (C_3)	4.75	1.87	65.00%
	HHT	0.60	0.00	0.00%
	Price per stick (excluding VAT)	12.49	1.90	17.63%
	Price per stick (including VAT)	14.11	2.14	17.63%
	$\epsilon = -0.8$			
	Consumption (# of sticks)	10.41b	-1.74b	-14.33%
	Tax Revenue	44.63b	13.06b	41.36%
	$\epsilon = -0.4$			
	Consumption (# of sticks)	11.28b	-0.87b	-7.16%
	Tax Revenue	48.36b	16.79b	53.18%

[15] We can directly calculate the change in consumption by percentage change in quantity to the initial consumption. However, we will need individual consumption when calculating the total revenue. An alternative method would be to find the proportion weighted tax rate and apply it to the total consumption.